

Claims:

1. An ink-jet recording sheet comprising a support and an ink accepting porous layer provided on the support, wherein the ink accepting porous layer comprises a hydrophilic binder containing a polymer compound crosslinked via irradiation of ionizing radiation, micro particles, and at least one component selected from the group consisting of (A) a nitrogen-containing compound, (B) a sulfur-containing compound, (C) a phenol compound and (D) a polyvalent metal salt.

2. The ink-jet recording sheet of Claim 1, wherein the micro particles have an average diameter of from 5 to 200 nm.

3. The ink-jet recording sheet of Claim 1, wherein a ratio of the micro particles to the hydrophilic binder is from 1:2 to 1:50 by weight.

4. The ink-jet recording sheet of Claim 3, wherein the ratio of the micro particles to the hydrophilic binder is from 1:5 to 1:15 by weight.

5. The ink-jet recording sheet of Claim 1, wherein the polymer compound crosslinked via irradiation of ionizing radiation is a polymer compound formed by crosslinking a hydrophilic resin having a dimer formable photosensitive group formed via irradiation of ionizing radiation.

6. The ink-jet recording sheet of Claim 1, wherein the nitrogen-containing compound is at least one selected from the group consisting of a hindered amine compound, a hydroxylamine compound and a water-soluble aliphatic tertiary amine compound.

7. The ink-jet recording sheet of Claim 1, wherein the nitrogen-containing compound is a polyallylamine compound.

8. The ink-jet recording sheet of Claims 1, wherein the nitrogen-containing compound is a tertiary amine compound.

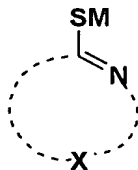
9. The ink-jet recording sheet of Claim 1, wherein the sulfur compound is a compound represented by Formula 1 or Formula 2:

Formula 1

$R-S-R'$

wherein R and R' are each an alkyl group or an aryl group,

Formula 2



wherein M is a hydrogen atom, an ammonium ion or a metal atom; X is a group of non-metal atoms necessary to form a five- through seven-member ring.

10. The ink-jet recording sheet of Claim 1, wherein the polyvalent metal salt is a water-soluble salt of one selected from the group consisting of cesium, magnesium, aluminum and zirconium.

11. The ink-jet recording sheet of Claim 1, wherein the phenol compound is a hindered phenol compound or a hydroquinone diether compound.

12. The ink-jet recording sheet of Claim 1, wherein the polymer compound is a polymer compound crosslinked through side chains of a hydrophilic polymer compound by irradiation via ionizing radiation, the hydrophilic compound

having a polymerization degree of not less than 300 and the plurality of side chains on a main chain.

13. The ink-jet recording sheet of Claim 1, wherein the ink accepting porous layer further comprises polyvinyl alcohol or its derivative.

14. A preparation method of an ink-jet recording sheet comprising a step of (a) forming a porous layer on a support in which the porous layer comprises a hydrophilic binder containing a polymer compound crosslinked via irradiation of ionizing radiation, micro particles, and at least one component selected from the group consisting of (A) a nitrogen-containing compound, (B) a sulfur-containing compound, (C) a phenol compound and (D) a polyvalent metal salt.

15. The preparation method of claim 14, wherein the step of (a) forming a porous layer comprises the steps;

(b) forming a coated film comprising a polymer compound and micro particles, on the support, and

(C) crosslinking the polymer compound via irradiation of ionizing radiation to the polymer compound.

16. The preparation method of claim 15, wherein the step of (a) forming a porous layer comprises, after the step (c), the step;

(d) providing coated film with the a coating liquid containing at least one component selected from the group consisting of (A) a nitrogen-containing compound, (B) a sulfur-containing compound, (C) a phenol compound and (D) a polyvalent metal salt.

17. The preparation method of claim 16, wherein the step of (d) is conducted after a time that water content of the coated film becomes less than the volume of pores in the ink accepting porous layer, during drying of the coated film, or after completion of drying of the coated film.

18. The preparation method of claim 16, wherein the step of (d) is conducted after completion of drying of the coated film.

19. The preparation method of Claims 16, wherein the polymer compound crosslinked by irradiation via ionizing radiation is a polymer compound formed by crosslinking a

hydrophilic resin having a dimer formable photosensitive group formed via irradiation of ionizing radiation.

20. The preparation method of Claim 16, wherein the nitrogen-containing compound is at least one selected from the group consisting of a hindered amine compound, a hydroxylamine compound and a water-soluble aliphatic tertiary amine compound.

21. The preparation method of Claim 16, wherein the nitrogen-containing compound which is an polyallylamine compound.

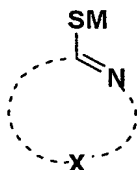
22. The preparation method of Claim 16, wherein the nitrogen-containing compound is a tertiary amine compound.

23. The preparation method of Claim 16, wherein the sulfur compound is a compound represented by Formula 1 or Formula 2:

Formula 1                      R-S-R'

wherein R and R' are each an alkyl group or an aryl group,

Formula 2



wherein M is a hydrogen atom, an ammonium ion or a metal atom; X is a group of non-metal atoms necessary to form a five- through seven-member ring.

24. The preparation method of Claim 16, wherein the polyvalent metal salt is a water-soluble salt of one selected from the group consisting of cesium, magnesium, aluminum and zirconium.

25. The preparation method of Claim 16, wherein the phenol compound is a hindered phenol compound or a hydroquinone diether compound.

26. The preparation method of Claim 16, wherein the polymer compound is a polymer compound crosslinked through side chains of a hydrophilic polymer compound having a polymerization degree of not less than 300 and the plurality of side chains on a main chain by irradiation via ionizing radiation.

27. The preparation method of Claim 16, wherein the ink accepting porous layer further comprises polyvinyl alcohol or its derivative.